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August 22, 2017

VIA ELECTRONIC FILING

The Honorable Jocelyn G. Boyd
Chief Clerk/Administrator
Public Service Commission of South Carolina
101 Executive Center Drive
Columbia, South Carolina 29210

RE: Application of South Carolina Electric & Gas Company for a Certificate of Environmental Compatibility and Public Convenience and Necessity for the Construction and Operation of the Graniteville-South Augusta 230 kV Tie Line and Urquhart-Graniteville #2 230 kV Tie Line and Associated Facilities
Docket No. 2017-221-E

Dear Ms. Boyd:

Enclosed for filing on behalf of South Carolina Electric & Gas Company ("SCE&G") in the above-captioned docket is the direct testimony and exhibits of Joseph Wade Richards and Nathan V. Bass, PLA.

By copy of this letter, we are serving counsel for all other parties of record with a copy of SCE&G's direct testimony and exhibits and attach a certificate of service to that effect.

If you have any questions or concerns, please do not hesitate to contact us.

Very truly yours,

Matthew W. Gissendanner

MWG/kms
Enclosures

(Continued . . .)

The Honorable Jocelyn G. Boyd
August 22, 2017
Page 2

cc: Dawn Hipp
Jeffrey M. Nelson, Esquire
Shannon Bowyer Hudson, Esquire
(all via electronic mail and hand delivery w/enclosures)
Alvin A. Taylor
Duane Parrish
Michael S. Traynham, Esquire
Susan A. Lake, Esquire
(all via electronic mail and U.S. First Class Mail w/enclosures)

BEFORE
THE PUBLIC SERVICE COMMISSION OF
SOUTH CAROLINA

DOCKET NO. 2017-221-E

IN RE:

Application of South Carolina Electric & Gas)	
Company for a Certificate of Environmental)	
Compatibility and Public Convenience and)	
Necessity for the Construction and Operation)	CERTIFICATE
of the Graniteville-South Augusta 230 kV Tie)	OF SERVICE
Line and Urquhart-Graniteville #2 230 kV Tie)	
Line and Associated Facilities)	
_____)	

This is to certify that I have caused to be served this day one copy of South Carolina Electric & Gas Company's **Direct Testimony and Exhibits of Joseph Wade Richards and Nathan V. Bass, PLA** to the persons named below to the addresses set forth and in the manner described:

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Karen M. Scruggs

Cayce, South Carolina

This 22nd day of August 2017

DIRECT TESTIMONY OF
JOSEPH WADE RICHARDS

ON BEHALF OF
SOUTH CAROLINA ELECTRIC & GAS COMPANY
DOCKET NO. 2017-221-E

Q. PLEASE STATE YOUR NAME, BUSINESS ADDRESS AND POSITION.

A. My name is Joseph Wade Richards. My business address is 601 Old Taylor Road, Mail Code J37, Cayce, South Carolina 29033. I am employed by South Carolina Electric & Gas Company ("SCE&G" or "Company") where I am a Senior Engineer in Transmission Planning.

Q. PLEASE DESCRIBE YOUR EDUCATIONAL AND BUSINESS BACKGROUND.

A. I am a graduate of Clemson University with a Bachelor of Science degree in Electrical Engineering. I am a registered Professional Engineer in the State of South Carolina.

I began working for SCE&G in 2008 as a System Controller. I was offered and I accepted an Associate Engineering position in Operations Planning in 2010. I was then offered and I accepted an Associate Engineering position in Transmission Planning in 2012. In 2017, I was promoted to my current position of Senior Engineer in Transmission Planning.

1 **Q. ARE YOU A MEMBER OF ANY INDUSTRY COMMITTEES FOR SYSTEM**
2 **RELIABILITY ASSESSMENT OR PLANNING?**

3 A. Yes, I am currently the primary representative for SCE&G on the SERC LTSG
4 (Long Term Study Group). I am the alternative representative for SCE&G on the
5 SERC DSG (Dynamics Study Group). Additionally, I am a member of the CTCA
6 (Carolinas Transmission Coordination Agreement) PFSG (Power Flow Study Group)
7 and DSG (Dynamics Study Group) and the EIPC (Eastern Interconnection Planning
8 Collaborative) SSMLFWG (Steady State Model Load Flow Working Group).

9 All of these committees are directly involved with assessing the current and
10 future capabilities of the integrated transmission grid in North America, the Southeast,
11 and Virginia/Carolinas.

12
13 **Q. PLEASE SUMMARIZE YOUR DUTIES AS A SENIOR ENGINEER IN**
14 **TRANSMISSION PLANNING.**

15 A. I facilitate planning and associated analyses of the SCE&G electric
16 transmission system to ensure compliance with required standards and criteria, as
17 discussed below, and to ensure the reliability and adequacy of interconnection
18 transmission facilities with neighboring utilities. The goal of transmission planning
19 at SCE&G is to ensure reliable and cost-effective delivery of electric power to
20 SCE&G customers while developing and maintaining strategically supportive
21 infrastructure to sustain and further South Carolina's economic development and
22 the Company's financial integrity.

1 **Q. PLEASE DESCRIBE THE PURPOSE OF YOUR TESTIMONY.**

2 A. The purpose of my testimony is to discuss the need and necessity for the
3 construction of two new 230 kV lines and associated facilities in Aiken County.

4 In its Application, the Company indicated that the first new line—the
5 Graniteville – South Augusta 230 kV Tie Line—would run from Southern
6 Company’s South Augusta Substation to SCE&G’s Graniteville Substation No. 1 in
7 Aiken County along existing rights-of-way (with the exception of an approximately
8 0.46 mile segment on the Urquhart Generating Station Site for which SCE&G will
9 dedicate a new 100 feet wide right-of-way); the portion of this line to be owned and
10 operated by SCE&G and for which a Certificate was requested in the Application
11 would be approximately 18.1 miles measured from the first transmission line
12 structure on the South Carolina side of the Savannah River to the Graniteville
13 Substation No. 1. Associated facilities to be added to SCE&G’s transmission
14 system include a 230 kV line terminal and a 230 kV power circuit breaker at the
15 Graniteville Substation No. 1 to accommodate the Graniteville – South Augusta 230
16 kV Tie Line.

17 With respect to the second new line—the Urquhart – Graniteville #2 230 kV
18 Line—the Company’s Application indicated that it would run for approximately
19 17.6 miles along existing right-of-way from the Company’s Urquhart Substation in
20 Aiken County to the Company’s Graniteville Substation No. 2 in Aiken County.

1 Each of these facilities as proposed in the Application is shown on the map
2 attached hereto as Exhibit No. __ (JWR-1).

3
4 **Q. SUBSEQUENT TO THE FILING OF THE COMPANY'S APPLICATION,**
5 **HAVE THERE BEEN ANY CHANGES TO THE DESIGN OF THE ROUTES**
6 **FOR THE NEW LINES?**

7 A. Yes. Subsequent to filing its Application in this docket, the Company
8 conducted an onsite constructability review and determined that terminating the
9 proposed Graniteville – South Augusta 230 kV Tie Line in the Graniteville
10 Substation No. 2, rather than the Graniteville Substation No. 1 as proposed in the
11 Application, and terminating the proposed the Urquhart – Graniteville #2 230 kV
12 Line in the Graniteville Substation No. 1, rather than the Graniteville Substation No.
13 2 as proposed in the Application, would facilitate installation of the new lines,
14 eliminate a 230 kV crossing near the Urquhart Generating Station, and reduce costs
15 associated with the construction of the lines. The Company does not believe these
16 proposed changes are material.

17 Under the new configuration, the proposed Graniteville – South Augusta 230
18 kV Tie Line will be renamed the Graniteville #2 – South Augusta 230 kV Tie Line,
19 which will now run approximately 18.1 miles measured from the first transmission
20 line structure on the South Carolina side of the Savannah River to the Graniteville
21 Substation No. 2, and the proposed Urquhart – Graniteville #2 230 kV Line will be

1 renamed the Urquhart – Graniteville 230 kV Line, which will now run
2 approximately 17.6 miles from the Urquhart Substation to the Graniteville
3 Substation No. 1. I will refer to the proposed lines using their new names
4 throughout the remainder of my testimony. The associated facilities to be added to
5 SCE&G’s transmission system, i.e., the 230 kV line terminal and the 230 kV power
6 circuit breaker at the Graniteville Substation No. 1, will now accommodate the
7 Urquhart – Graniteville 230 kV Line.

8 The new proposed configuration is shown on the map attached hereto as
9 Exhibit No. __ (JWR-2). The new configuration remains in existing right-of-way and,
10 as detailed by Company Witness Bass, has no impact on any of the findings in the
11 Transmission Line Siting and Environmental Report for the new lines.

12
13 **Q. WHAT CRITERIA DOES SCE&G USE TO DETERMINE WHEN NEW**
14 **TRANSMISSION FACILITIES ARE NEEDED?**

15 A. The Company uses national and internal criteria to guide its decision-making
16 related to the development of new or upgraded transmission facilities. Nationally,
17 our Company subscribes to the Transmission Planning Standards established by
18 NERC, and internally SCE&G adheres to its Long Range Planning Criteria. In
19 accordance with these standards and criteria, the SCE&G Transmission System is
20 designed so that nothing more serious than local load impacts will occur during
21 certain contingencies and so that after appropriate switching and re-dispatching, all

1 non-radial loads can again be served with reasonable voltages, and all facilities can
2 again operate within acceptable operating limits. A sample of contingencies
3 considered includes:

- 4 1. Loss of any generator;
- 5 2. Loss of any transmission circuit operating at a voltage level of 115 kV or
6 above;
- 7 3. Loss of any transmission transformer;
- 8 4. Loss of any electrical bus and associated facilities operating at a voltage level
9 of 115 kV or above;
- 10 5. Loss of all 115 kV or above circuits on a common structure;
- 11 6. Loss of entire generating capacity in any one generating plant;
- 12 7. Loss of any generating unit simultaneously with the loss of a single
13 transmission line;
- 14 8. Loss of all components associated with a transmission circuit breaker failure;
15 and
- 16 9. Loss of any generator, transmission circuit, or transmission transformer,
17 followed by manual system adjustments, followed by the loss of another
18 generator, transmission circuit, or transmission transformer.

19
20 **Q. WHY ARE THE LINES AND ASSOCIATED FACILITIES NEEDED?**

21 A. Transmission Planning studies indicate that the occurrence of certain
22 contingencies will result in heavy electrical loading on a critical Southern Company-

1 SCE&G interconnecting 230 kV Line (Vogtle – Savannah River Site 230 kV Tie
2 Line) as early as 2019. SCE&G presently experiences operating conditions where
3 the Vogtle – Savannah River Site 230 kV Tie Line would overload under current
4 conditions but for Operating Guides that allow SCE&G to relieve the excessive
5 loading conditions. However, should the present rate of increase in electrical
6 loading on the line continue, the Operating Guides would be insufficient to relieve
7 the excessive loading conditions as early as 2019. To prevent future excessive
8 loading conditions on this line and to distribute the flow of power more reliably and
9 evenly into the SCE&G system, additional electrical transmission paths are
10 necessary between Southern Company and SCE&G. After studying multiple
11 options with Southern Company and others to decrease the power flow on the
12 Vogtle – Savannah River Site 230 kV Tie Line, SCE&G and Southern Company
13 have agreed to construct two new Southern Company/SCE&G interconnecting tie
14 lines—the Graniteville #2 – South Augusta 230 kV Tie Line and the Graniteville #2
15 – South Augusta 115 kV Tie Line—which will cross the Savannah River and enter
16 South Carolina at SCE&G’s Urquhart Generating Station site. In addition to
17 decreasing the power flow on the existing Vogtle – Savannah River Site 230 kV Tie
18 Line and more reliably and evenly distributing the flow of power into the SCE&G
19 system, the new tie lines will increase the transfer capacity for SCE&G and for all
20 utilities interconnected to SCE&G’s electrical transmission system.

21 With respect to the proposed Urquhart – Graniteville 230 kV Line, it will
22 serve as a replacement for the existing Urquhart – Graniteville #2 230 kV Line,

1 which is one of two transmission lines that service the Urquhart Generating
2 Station's two 230 kV generators totaling 330 MW. The existing 230 kV Line will
3 be operated at 115 kV and will become a portion of the Graniteville #2 – South
4 Augusta 115 kV Tie Line. Replacing the existing Urquhart – Graniteville #2 230
5 kV Line with the proposed Urquhart – Graniteville 230 kV Line on double-circuit
6 230 kV structures alongside the Graniteville #2 – South Augusta 230 kV Tie Line
7 will maintain the current operating flexibility and level of reliability required for the
8 Urquhart generators.

9
10 **Q. ARE THE EXPECTED EXCESSIVE LOADING CONDITIONS ON THE**
11 **VOGTLE – SAVANNAH RIVER 230 KV TIE LINE IN 2019 THE RESULT**
12 **OF SOUTHERN COMPANY'S CONSTRUCTION OF VOGTLE UNITS 3**
13 **AND 4?**

14 A. No. As stated previously, SCE&G presently experiences operating
15 conditions where the Vogtle – Savannah River Site 230 kV Tie Line would overload
16 under current conditions but for Operating Guides that allow SCE&G to relieve the
17 excessive loading conditions. Studies indicate that power flows will continue to
18 increase each year, and the Operating Guides will be insufficient to relieve the
19 excessive loading conditions, requiring the relief provided by the new Lines by
20 2019, even without the addition of the Vogtle Units #3 and #4. Addition of the
21 Vogtle Units #3 and #4 would only exacerbate the existing issues.

Q. IN DETERMINING TO BUILD THE LINES, WHAT ALTERNATIVES DID SCE&G CONSIDER?

A. SCE&G Transmission Planning and Southern Company (Georgia ITS) jointly considered five alternatives to address the Vogtle – Savannah River Site 230 kV Tie Line: 1) constructing a new Hatch – Wadley 500 kV Line, 2) installing a series line reactor greater than one percent in size (up to four percent) in series with the Vogtle – Savannah River Site 230 kV Tie Line, 3) installing a one percent series line reactor in series with the Vogtle – Savannah River Site 230 kV Tie Line and constructing a new Graniteville – Evans 230 kV Tie Line, 4) installing a one percent series line reactor in series with the Vogtle – Savannah River Site 230 kV Tie Line and constructing a new Graniteville – 15th Street 230 kV Tie Line, and 5) installing a one percent series line reactor in series with the Vogtle – Savannah River Site 230 kV Tie Line and constructing a new 230 kV Tie Line and a new 115 kV Tie Line from Southern Company’s South Augusta Substation to the Company’s Graniteville Substation.

Option 1 was not feasible due to time constraints. Option 2 was found to produce unacceptable stability issues at Plant Vogtle during line outage conditions, and options 3 and 4 caused various other transmission facilities to overload for certain contingencies. Therefore, option 5 was the chosen solution; option 5 meets the needs of SCE&G system and also further supports system reliability by providing a third 230 kV source into Graniteville,

1 As I explained earlier in my testimony, the Company has now decided to
2 terminate the 230 and 115 kV tie lines at the Company's Graniteville Substation No.
3 2 instead of the Graniteville Substation No. 1.

4
5 **Q. PLEASE DESCRIBE THE PROCESS BY WHICH SCE&G SELECTED**
6 **THE ROUTE FOR THE GRANITEVILLE #2 – SOUTH AUGUSTA 230 KV**
7 **TIE LINE AND THE URQUHART – GRANITEVILLE 230 kV LINE.**

8 A. SCE&G determined that the Lines could be built entirely within the existing
9 rights-of-way that runs between the Urquhart 230 kV Substation and Graniteville
10 Substations No. 1 and No. 2 and within a combination of new and existing rights-
11 of-way, approximately 0.92 miles in length, located entirely on SCE&G's Urquhart
12 Generating Station site. The use of existing rights-of-way significantly minimizes
13 potential for environmental, land use, cultural resource and scenic impacts and
14 eliminates costs associated with the acquisition of new rights-of-way. Therefore,
15 SCE&G did not consider alternate greenfield routes for the construction of the
16 proposed Lines.

17
18 **Q. WHAT IS THE ESTIMATED COST AND IN-SERVICE DATE OF THE**
19 **PROPOSED LINES AND ASSOCIATED FACILITIES?**

20 A. The total cost of construction for the proposed Lines and associated facilities
21 (including other incidental projects) is approximately \$29,445,000, which is slightly
22 higher than the \$28,000,000 estimate included in the Transmission Line Siting and

1 Environmental Report, attached as Exhibit A to the Company's Application in this
2 docket.

3 The Lines and associated facilities are scheduled to be completed by May 31,
4 2019.

5
6 **Q. WHY IS YOUR ESTIMATED COST FOR THE NEW CONFIGURATION**
7 **PROPOSED IN THIS DIRECT TESTIMONY HIGHER THAN THE**
8 **ESTIMATED COST OF \$28 MILLION PROVIDED IN THE**
9 **TRANSMISSION LINE SITING AND ENVIRONMENTAL REPORT FOR**
10 **THE CONFIGURATION IN THE APPLICATION?**

11 A. The estimate in the Transmission Line Siting and Environmental Report was
12 a rounded estimate of \$27,615,000 in transmission costs. That estimate
13 inadvertently included certain transmission costs that are not associated with or
14 incidental to the construction of the Lines and excluded certain costs for substation
15 work associated with the Lines such that the actual cost estimate for the Lines and
16 associated facilities (including incidental projects) at the time Transmission Line
17 Siting and Environmental Report attached to the Company's Application was
18 prepared was actually \$29,915,000. SCE&G has also identified two incidental
19 projects totaling \$555,000 since the estimate for the Transmission Line Siting and
20 Environmental Report attached to the Company's Application was made, bringing
21 the total cost for the project as described in the Application to \$30,470,000.

1 However, the new configuration proposed in my direct testimony eliminates
2 approximately \$1,025,000 in costs by eliminating a 230 kV Line crossing near the
3 Urquhart Generating Station, eliminating one of the incidental projects identified
4 after the Transmission Line Siting and Environmental Report attached to the
5 Company's Application was made, and eliminating a new termination at
6 Graniteville Substation No. 1 that would have been required to terminate the new
7 115 kV Tie Line at Graniteville Substation No. 1 instead of Graniteville Substation
8 No. 2.

9
10 **Q. DOES YOUR COST ESTIMATE INCLUDE ANY COSTS ASSOCIATED**
11 **WITH THE PORTION OF THE GRANITEVILLE #2 – SOUTH AUGUSTA**
12 **230 KV TIE LINE TO BE OWNED AND OPERATED BY SOUTHERN**
13 **COMPANY?**

14 A. No. SCE&G is not responsible for any costs associated with the construction
15 and operation of the portion of the Graniteville #2 – South Augusta 230 kV Tie Line
16 to be owned and operated by Southern Company.

17
18 **Q. DO THE PROPOSED LINES AND ASSOCIATED FACILITIES SERVE**
19 **THE INTERESTS OF SYSTEM ECONOMY AND RELIABILITY?**

20 A. Yes. The proposed facilities serve the interests of system economy and
21 reliability. They represent the most cost-effective proposal in light of system needs

1 and constraints and the best long-term solution for the continued transmission of
2 safe, reliable electric power to SCE&G's customers. The addition of the
3 Graniteville #2 – South Augusta 230 and 115 kV Tie Lines and associated facilities
4 will establish additional electrical paths between SCE&G and Southern Company
5 electrical transmission systems and allow power to flow more reliably and evenly
6 into the SCE&G system without overloading the critical Vogtle – Savannah River
7 Site 230 kV Tie Line. Moreover, using the existing Urquhart – Graniteville #2 230
8 kV Line as a portion of the Graniteville #2 – South Augusta 115 kV Tie Line and
9 replacing it with the proposed Urquhart – Graniteville 230 kV Line will maintain
10 the level of 230 kV service, operating flexibility, and reliability level required by
11 the two 230 kV generators at the Urquhart Generating Station.

12
13 **Q. IS THERE A REASONABLE ASSURANCE THAT THE LINES AND**
14 **ASSOCIATED FACILITIES WILL CONFORM TO APPLICABLE STATE**
15 **AND LOCAL LAWS AND REGULATIONS?**

16 A. Yes. SCE&G currently operates all of its existing transmission facilities
17 within the applicable state and local laws and regulations, and we are committed to
18 operating the Lines and associated facilities within applicable state and local laws
19 and regulations as well.
20

1 **Q. DOES THE PUBLIC CONVENIENCE AND NECESSITY REQUIRE THE**
2 **CONSTRUCTION OF THE LINES AND ASSOCIATED FACILITIES?**

3 A. Yes. The public convenience and necessity requires construction of the
4 Lines and associated facilities. These new Lines and associated facilities are critical
5 to the operational integrity of SCE&G's electrical transmission system and
6 necessary to ensure that SCE&G remains in compliance with the NERC
7 Transmission Planning Standards and the Company's own Long Range Planning
8 Criteria. Failure to construct the Lines and associated facilities could result in
9 excessive electrical loading on the critical Vogtle – Savannah River Site 230 kV Tie
10 Line. Accordingly, the new Lines and associated facilities serve the interests of
11 system economy and reliability.

12
13 **Q. WHAT ARE YOU ASKING THIS COMMISSION TO DO?**

14 A. SCE&G respectfully asks that the Commission issue a Certificate of
15 Environmental Compatibility and Public Convenience and Necessity for the
16 construction and operation of the Graniteville #2 – South Augusta 230 kV Tie Line
17 and the Urquhart – Graniteville 230 kV Line and associated facilities, as proposed
18 in the Company's Application and modified herein.

19
20 **Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?**

21 A. Yes.

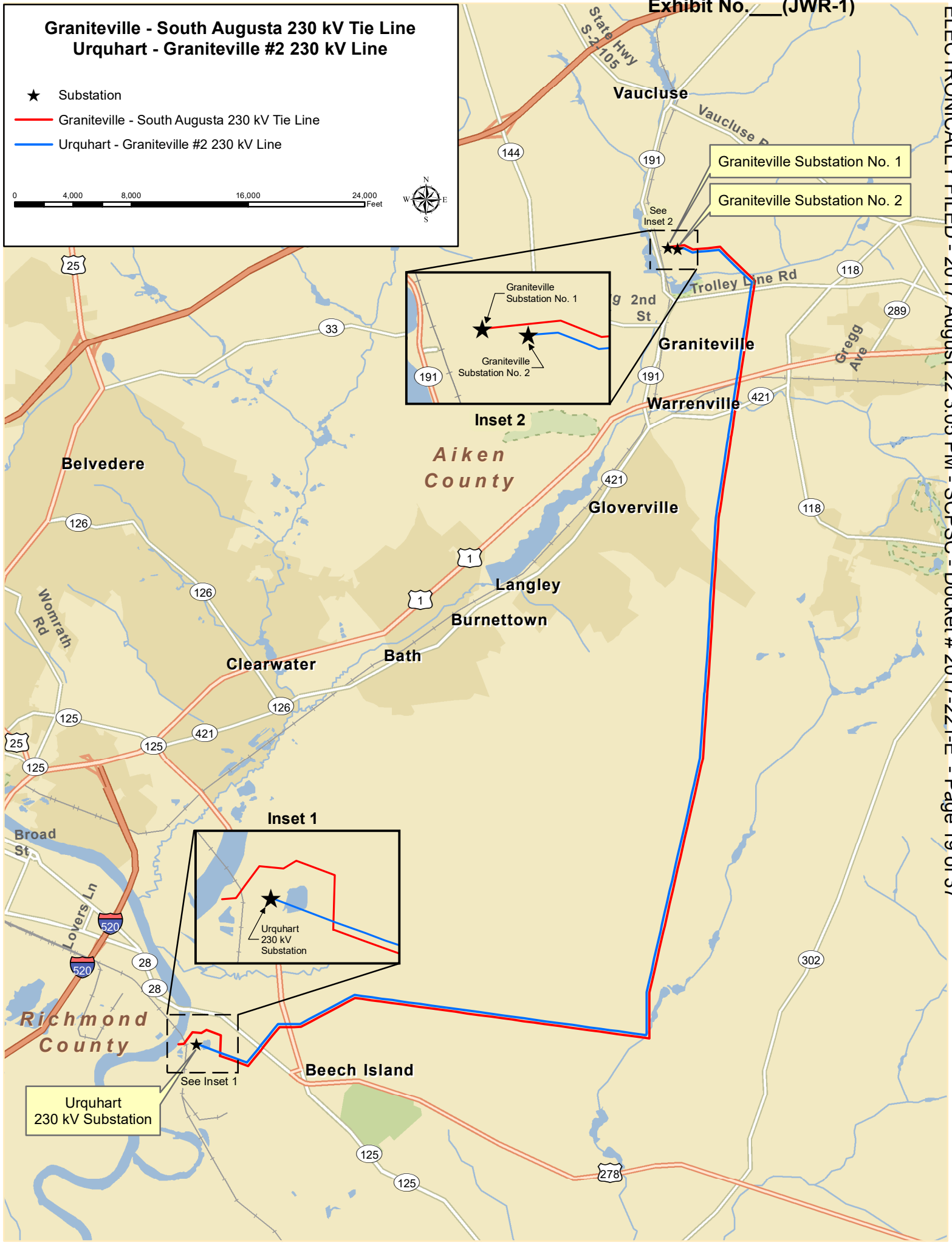
Graniteville - South Augusta 230 kV Tie Line
Urquhart - Graniteville #2 230 kV Line

★ Substation

— Graniteville - South Augusta 230 kV Tie Line

— Urquhart - Graniteville #2 230 kV Line

0 4,000 8,000 16,000 24,000 Feet



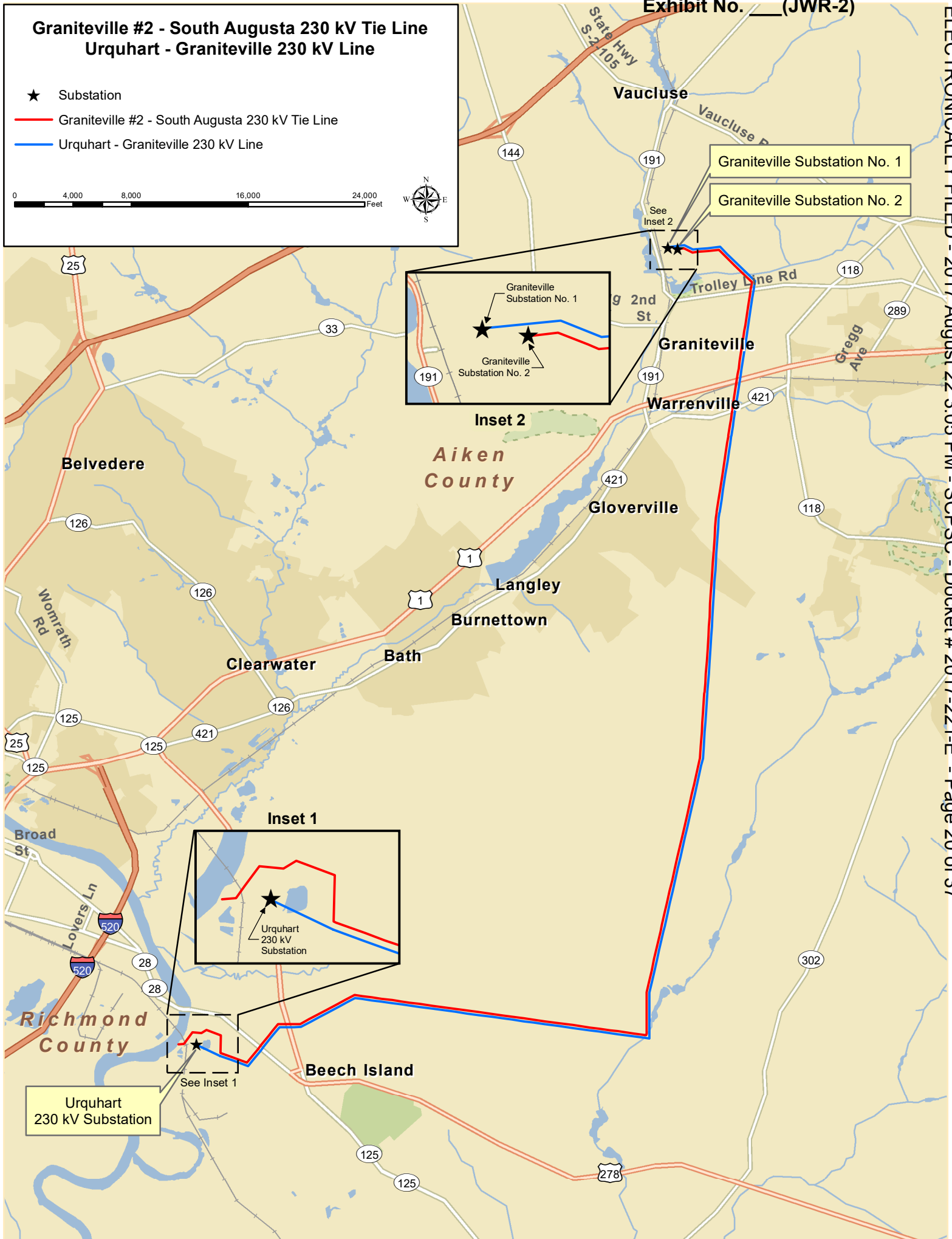
Graniteville #2 - South Augusta 230 kV Tie Line Urquhart - Graniteville 230 kV Line

★ Substation

— Graniteville #2 - South Augusta 230 kV Tie Line

— Urquhart - Graniteville 230 kV Line

0 4,000 8,000 16,000 24,000 Feet



DIRECT TESTIMONY OF

NATHAN V. BASS, PLA

ON BEHALF OF

SOUTH CAROLINA ELECTRIC & GAS COMPANY

DOCKET NO. 2017-221-E

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Nathan V. Bass. My business address is 123 North White Street, Fort Mill, South Carolina 29715.

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A. I am employed by UC Synergetic, LLC, a wholly owned subsidiary of Pike Corporation, as Manager of the Facilities Planning & Siting (“FPS”) division. UC Synergetic—with approximately 1,500 employees in 34 offices located in 28 states—provides electrical transmission and distribution systems planning, siting, permitting, engineering and project management services to electrical utility clients throughout the United States.

Q. PLEASE BRIEFLY DESCRIBE YOUR EDUCATIONAL BACKGROUND, PROFESSIONAL ASSOCIATIONS, AND BUSINESS EXPERIENCE.

From North Carolina State University, I received a Bachelor of Science degree in horticulture and landscape design in 2008 and a Master of Landscape

1 Architecture degree in 2010. I was employed by Pike Energy Solutions, LLC (now
2 known as UC Synergetic, LLC) as a landscape architect in the FPS division in
3 February 2011 and became manager of that division in January of this year. As
4 manager of FPS, I am responsible for directing the division's delivery of services
5 that include siting electrical transmission lines and substations, civil engineering
6 (specifically, civil site design and stormwater management planning and design),
7 environmental assessments and planning, visual impact studies and mitigation
8 planning, cultural resource studies, landscape architectural planning and design and
9 project permitting and licensing.

10 Since 1987, the FPS division, which was previously a department within
11 Duke Energy, has executed and managed the successful siting, permitting and
12 licensing of more than 195 transmission lines, virtually all of which are located in
13 North and South Carolina. I served as the FPS project manager for the services
14 rendered to SCE&G on the Graniteville #2 – South Augusta 230 kV Tie Line and
15 Urquhart – Graniteville 230 kV Line project and have personally participated in
16 more than 30 transmission line siting and permitting projects.

17 I am a licensed professional landscape architect in the states of South
18 Carolina and North Carolina and have achieved North Carolina State University
19 sponsored Stormwater Best Management Practices Inspection and Maintenance
20 Certification, which is a supplement to my professional licenses.

1 **Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?**

2 A. The purpose of my testimony is to discuss the transmission line siting
3 methodology that SCE&G, in collaboration with FPS, utilized to evaluate the route
4 for the Graniteville #2 – South Augusta 230 kV Tie Line and Urquhart – Graniteville
5 230 kV Line (“Lines”) and associated facilities. My company conducted studies,
6 compiled data and analyzed extensive information regarding environmental, land
7 use, cultural resource, and visual effects, if any, that will result from constructing
8 the proposed Lines.

9
10 **Q. DO YOU HAVE ANY DOCUMENTS THAT SUPPORT OR ILLUSTRATE**
11 **YOUR TESTIMONY?**

12 A. Yes. As SCE&G’s siting and project permitting consultant, I am the author
13 of the Transmission Line Siting and Environmental Report for the Graniteville-
14 South Augusta 230 kV Tie Line and Urquhart-Graniteville #2 230 kV Line and
15 Associated Facilities, dated April 2017 and attached to SCE&G’s Application in
16 this docket as Exhibit A. A revised version of the report entitled Transmission Line
17 Siting and Environmental Report for the Graniteville #2 – South Augusta 230 kV
18 Tie Line and Urquhart – Graniteville 230 kV Line and Associated Facilities
19 (“Transmission Line Siting and Environmental Report”) and dated August 2017 is
20 attached to this testimony as Exhibit No. __ (NVB-1). This report details the need
21 for the Lines and associated facilities and the research and studies conducted

1 regarding the environmental, land use, cultural resource, and visual effects of the
2 Lines and the associated facilities.

3
4 **Q. WHY WAS REVISION OF THE TRANSMISSION LINE SITING AND**
5 **ENVIRONMENTAL REPORT NECESSARY?**

6 A. Subsequent to the filing of the Application in this docket, the Company
7 determined that terminating the proposed Graniteville – South Augusta 230 kV Tie
8 Line in the Graniteville Substation No. 2 rather than the Graniteville Substation No.
9 1 as proposed in the Application and terminating the proposed Urquhart –
10 Graniteville #2 230 kV Line in the Graniteville Substation No. 1 rather than the
11 Graniteville Substation No. 2 as proposed in the Application would facilitate
12 installation of the new lines, eliminate a 230 kV crossing, and reduce costs
13 associated with the construction of the lines. As such, I have revised the
14 Transmission Line Siting and Environmental Report to reflect the new
15 configuration. The revisions are non-material, and the findings as to environmental,
16 land use, cultural resource, and aesthetic effects remain the same.

1 **Q. PLEASE DESCRIBE THE ROUTE FOR THE PROPOSED**
2 **GRANITEVILLE #2 – SOUTH AUGUSTA 230 KV TIE LINE AND**
3 **URQUHART – GRANITEVILLE 230 KV LINE.**

4 A. The Graniteville #2 – South Augusta 230 kV Tie Line will originate at
5 Southern Company's South Augusta Substation on Dan Bowles Road in Augusta,
6 Georgia and will run for approximately 5.2 miles in an existing Southern Company
7 transmission line right-of-way to a double-circuit 230 kV structure on the South
8 Carolina side of, and adjacent to, the Savannah River. From that structure, the
9 Graniteville #2 – South Augusta 230 kV Tie Line route will run for approximately
10 0.92 miles within a combination of new and existing right-of-way on SCE&G's
11 Urquhart Generating Station site. This route segment will intersect an existing
12 SCE&G transmission line right-of-way corridor and the Urquhart – Graniteville 230
13 kV Line approximately 2,000 feet east of SCE&G's Urquhart 230 kV Substation.
14 From the intersection point, the route for the Graniteville #2 – South Augusta 230
15 kV Tie Line and Urquhart – Graniteville 230 kV Line runs in north easterly/easterly
16 directions for approximately 6.0 miles, where it turns and runs in a northerly
17 direction on the west side of Aiken, South Carolina, for approximately 9.9 miles to
18 an angle point. The Lines' route turns at that angle point and runs in north
19 westerly/westerly directions for approximately 1.4 miles to Graniteville Substations
20 No. 1 and No. 2.

1 **Q. WILL THE PROPOSED GRANITEVILLE #2 – SOUTH AUGUSTA 230 KV**
2 **TIE LINE AND URQUHART – GRANITEVILLE 230 KV LINE AND**
3 **ASSOCIATED FACILITIES HAVE ANY SIGNIFICANT SHORT- OR**
4 **LONG-TERM ENVIRONMENTAL IMPACTS?**

5 A. No. As explained in more detail in the revised Transmission Line Siting and
6 Environmental Report, the construction and operation of the Graniteville #2 – South
7 Augusta 230 kV Tie Line and Urquhart – Graniteville 230 kV Line will not have
8 any significant short- or long-term impacts on the environment.

9
10 **Q. WHAT WAS THE CONCLUSION OF THE STUDIES THAT WERE**
11 **CONDUCTED FOR THE GRANITEVILLE #2 – SOUTH AUGUSTA 230 KV**
12 **TIE LINE AND URQUHART – GRANITEVILLE 230 KV LINE AND**
13 **ASSOCIATED FACILITIES TO DETERMINE EFFECTS TO RARE,**
14 **THREATENED AND ENDANGERED SPECIES?**

15 A. Palmetto Environmental Consulting, Inc. (“PEC”) conducted protected
16 species literature and records searches in September 2014 and February 2017 to
17 determine the presence of known occurrences of federally and state-listed animal
18 and plant species on or within one mile of the existing and proposed rights-of-way
19 within which the Graniteville #2 – South Augusta 230 kV Tie Line and Urquhart –
20 Graniteville 230 kV Line will be located. The literature and records searches
21 revealed four known occurrences of federally endangered red-cockaded
22 woodpecker (*Picoides borealis*), all last observed between 1975 and 1984, within

1 one mile of the proposed route for the Graniteville #2 – South Augusta 230 kV Tie
2 Line and Urquhart – Graniteville 230 kV Line; however, the records revealed that
3 the species were determined to be extirpated during a protected species investigation
4 that was conducted in 1987. Although no listed species are documented to exist
5 within future Lines' right-of-way, the record searches revealed that the Lines' route
6 is within one mile of recorded occurrences of the following listed plant species:

- 7 • One occurrence of bog spicebush (last observed in 1995), which is listed by
8 the South Carolina Department of Natural Resources (SCDNR) as S3;
- 9 • A population of sweet pitcher-plant (last observed 1995); SCDNR listed as
10 S3/S4;
- 11 • One occurrence of piedmont water-milfoil (last observed in 1983); SCDNR
12 listed as S2; and
- 13 • One occurrence of red standing-cypress (last observed in 1981); SCDNR
14 listed as S2.

15 SCE&G engaged PEC to inspect the right-of-way to verify the presence or
16 absence of state-and/or federal-listed threatened and endangered species, and none
17 were found during an October 2014 field investigation along the existing right-of-
18 way, which was confirmed during a February 2017 field investigation when PEC
19 reexamined the existing right-of-way. Likewise, no listed species were found by
20 PEC during a February 2017 field investigation along the 0.92-mile segment of the
21 Graniteville #2 – South Augusta 230 kV Tie Line that will be constructed on the
22 Urquhart Generating Station site. However, potential habitat (i.e., soil, water,

1 vegetative, sun/shade exposure and slope aspect conditions that would potentially
2 support specific plant or animal species) that would likely support 32 listed species
3 (6 animal species and 26 plant species) was found by PEC along the existing right-
4 of-way. PEC reported that potential habitat for 22 listed species (2 animal species
5 and 20 plant species) is present along the proposed new right-of-way segment that
6 will reside on the Urquhart Generating Station site.

7 Due to the confirmed absence of protected species in the existing and
8 proposed right-of-way and, further, due to no changes in potential habitat for listed
9 species except for a minor amount of vegetative clearing on the Urquhart Generating
10 Station site, no adverse effects to rare, threatened or endangered animal or plant
11 species will occur as a result of construction and operation of the Graniteville #2 –
12 South Augusta 230 kV Tie Line and Urquhart – Graniteville 230 kV Line.

13
14 **Q. PLEASE DESCRIBE THE IMPACTS TO WETLANDS OR STREAMS, IF**
15 **ANY, THAT WILL RESULT FROM CONSTRUCTION AND OPERATION**
16 **OF THE GRANITEVILLE #2 – SOUTH AUGUSTA 230 KV TIE LINE AND**
17 **URQUHART – GRANITEVILLE 230 KV LINE AND ASSOCIATED**
18 **FACILITIES.**

19 A. Construction and operation of the Graniteville #2 – South Augusta 230 kV
20 Tie Line and Urquhart – Graniteville 230 kV Line and associated facilities will have
21 no significant short- or long-term impacts to wetlands or streams. Based on wetland
22 surveys and delineations conducted in October 2014 and February 2017 by PEC,

1 approximately 12.8 acres of wetlands and approximately 1.7 acres of open water
2 reside in the existing and proposed right-of-way within which the Graniteville #2 –
3 South Augusta 230 kV Tie Line and Urquhart – Graniteville 230 kV Line will be
4 built. Also, approximately 2,010 linear feet of stream channels are present in the
5 right-of-way.

6 No structures will be placed in open water, streams or stream buffer zones,
7 and no navigable waters will be crossed by the Lines. To the extent practical,
8 SCE&G will design the Lines to span wetlands; however, in the unlikely event a
9 structure is required within a wetland, access to it for construction purposes will be
10 accomplished on fiberglass or wooden mats, and no permanent roads will be
11 constructed in the wetlands.

12 SCE&G will utilize established, proven wetland protection guidelines when
13 operating near or within wetland areas, and the function of wetlands crossed by the
14 Lines will not be changed.

15 The Graniteville #2 – South Augusta 230 kV Tie Line and Urquhart –
16 Graniteville 230 kV Line will cross six streams and one small pond. Any existing
17 low-growing vegetation will be left intact in stream buffer zones, and root mats in
18 any specified buffer zones will not be disturbed. SCE&G will install erosion control
19 measures wherever they may be required to prevent translocation of sediment from
20 construction sites to wetlands or streams.

21 No filling or clearing will occur in wetlands or stream buffer zones. As such,
22 and because of SCE&G's commitment to install and maintain appropriate erosion

1 control measures over the entire project, no wetland or stream impacts will result
2 from construction and operation of the Graniteville #2 – South Augusta 230 kV Line
3 and Urquhart – Graniteville 230 kV Line.
4

5 **Q. WILL CONSTRUCTION OF THE GRANITEVILLE #2 – SOUTH**
6 **AUGUSTA 230 KV TIE LINE AND URQUHART – GRANITEVILLE 230 KV**
7 **LINE AND ASSOCIATED FACILITIES COMPLY WITH**
8 **RECOMMENDATIONS IN THE LETTER FROM THE SOUTH**
9 **CAROLINA DEPARTMENT OF NATURAL RESOURCES (“SCDNR”) TO**
10 **THE HONORABLE JOCELYN G. BOYD, DATED JULY 27, 2017?**

11 A. Yes. SCE&G plans to comply with the recommendations outlined in the
12 letter from the SCDNR to The Honorable Jocelyn G. Boyd, dated July 27, 2017.
13 Moreover, SCE&G will take all necessary steps should any unexpected wetland or
14 stream impacts present themselves and will employ all appropriate measures to
15 minimize or avoid any impacts to any rare, threatened, or endangered species and
16 their habitats that may be discovered in the project area.
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1 **Q. WHAT WAS THE CONCLUSION OF THE CULTURAL RESOURCE**
2 **INVESTIGATION THAT WAS CONDUCTED ALONG THE ROUTE OF**
3 **THE GRANITEVILLE #2 – SOUTH AUGUSTA 230 KV TIE LINE AND**
4 **URQUHART – GRANITEVILLE 230 KV LINE AND ASSOCIATED**
5 **FACILITIES?**

6 A. SCE&G engaged Brockington and Associates, Inc. (“Brockington”) in
7 March 2014 to conduct background research to identify all previously recorded
8 archaeological and historic resources within 1.25 miles of the existing right-of-way
9 within which the Graniteville #2 – South Augusta 230 kV Line and Urquhart –
10 Graniteville 230 kV Line will be located. Moreover, the scope of Brockington’s
11 work included a windshield reconnaissance survey to identify any previously
12 unrecorded individual architectural, multi-property and/or district architectural
13 resources within 1.25 miles of the existing right-of-way that appear potentially
14 eligible for listing in the National Register of Historic Places (“NRHP”).

15 With regard to individual architectural, multi-property and/or district
16 resources, Brockington identified eighteen resources (ten previously recorded and
17 eight identified during the windshield survey) within 1.25 miles of the proposed
18 route for the Graniteville #2 – South Augusta 230 kV Tie Line and Urquhart –
19 Graniteville 230 kV Line. Because none of the resources are within the existing or
20 proposed right-of-way within which the Lines will be built, none will be directly
21 affected. Also, pursuant to Brockington’s recommendation, FPS conducted a
22 comprehensive visual impact analysis and determined that construction of the

1 Graniteville #2 – South Augusta 230 kV Tie Line and Urquhart – Graniteville 230
2 kV Line will have no adverse visual effects on the eighteen resources.

3 SCE&G also engaged Brockington to conduct a Phase I archaeological
4 investigation in the existing right-of-way within which the Graniteville #2 – South
5 Augusta 230 kV Tie Line and Urquhart – Graniteville 230 kV Line will be built.
6 The Phase I archaeological investigation included background research to determine
7 the presence of previously recorded archaeological sites, if any, within 1.25 miles
8 of the proposed Lines' route and their current NRHP eligibility status. The
9 background research revealed nine previously recorded archaeological sites (eight
10 in South Carolina and one in Georgia) within 1.25 miles of the Lines' route within
11 the existing SCE&G right-of-way. Brockington determined that none of the nine
12 previously recorded archaeological sites will be directly or indirectly affected by
13 construction of SCE&G's portion of the Graniteville #2 – South Augusta and
14 Urquhart – Graniteville 230 kV Lines because none are located within the existing
15 SCE&G right-of-way.

16 After completing the background research, Brockington continued the Phase
17 I archaeological investigation by conducting a comprehensive field survey in the
18 existing right-of-way within which the Lines' will be built to determine the
19 presence, if any, of previously unrecorded archaeological resources and recommend
20 the NRHP status of any discovered. The field survey, which was conducted from
21 April 28 to May 9, 2014, included 837 shovel test excavations that led to the
22 identification of three previously unrecorded archaeological sites and two isolated

1 finds within 50 feet of the proposed centerline of the Graniteville #2 – South
2 Augusta 230 kV Tie Line and Urquhart – Graniteville 230 kV Line. Brockington
3 determined that the three archaeological sites display very low artifact density and
4 lack diagnostic artifacts and are thus recommended not eligible for listing on the
5 NRHP. Similarly, according to Brockington, the two isolated finds are not eligible
6 for the NRHP. Brockington, therefore, determined that the project will have no
7 adverse effects on archaeological resources in the existing right-of-way between
8 Urquhart 230 kV Substation and Graniteville Substations No. 1 and No. 2.
9 Brockington submitted the findings of the Phase I archaeological investigation to
10 the State Historic Preservation Office (“SHPO”) in a report entitled Phase I
11 Archaeological Resources Survey of the 17.6 Mile Urquhart-Graniteville
12 Transmission Line Corridor dated September 2014 and received a concurrence
13 letter from them dated November 17, 2014, that stated, “*Our office accepts the final*
14 *report, and no further documentation is necessary for this project.*”

15 Subsequent to the 2014 Phase I archaeological investigation, SCE&G
16 determined it would be necessary to place the Graniteville #2 – South Augusta 230
17 kV Tie Line on a combination of existing and new right-of-way that bypasses the
18 Urquhart Generating Station and Urquhart 230 kV Substation. Consequently, an
19 approximately 0.92-mile route segment was developed that will reside entirely on
20 the Urquhart Generating Station site and bypass the generating station on its north
21 side before connecting to the existing SCE&G right-of-way previously investigated
22 by Brockington in 2014 that runs between the Urquhart 230 kV Substation and

1 Graniteville Substations No. 1 and No. 2. In February 2017, SCE&G engaged
2 Brockington to conduct a Phase I archaeological investigation within the proposed
3 0.92-mile segment of right-of-way. After conducting comprehensive shovel test
4 excavations throughout the proposed 0.92-mile segment on February 16-17, 2017,
5 Brockington concluded that no cultural materials are present in the 100-foot-wide,
6 0.92-mile corridor; therefore, construction of the Graniteville #2 – South Augusta
7 230/115 kV Tie Lines in the proposed 0.92-mile segment of right-of-way will have
8 no adverse effects to archaeological resources. Brockington reported the findings
9 of this investigation in a report dated February 27, 2017, entitled Archaeological
10 Survey of the Graniteville-South Augusta 230 kV Tie Line at the Urquhart
11 Generating Station Site, Aiken County, South Carolina. This report was submitted
12 to the SHPO as an addendum report to the one previously filed for the project in
13 2014, and the SHPO in a letter to Brockington dated March 28, 2017, accepted it as
14 final.

15 Given the systematic approach SCE&G has executed to date and will
16 exercise during construction of the Graniteville #2 – South Augusta 230 kV Tie
17 Line and Urquhart – Graniteville 230 kV Line to identify and protect cultural
18 resources, no adverse impacts are anticipated.

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Q. WHAT WILL BE THE VISUAL EFFECTS OF THE PROPOSED GRANITEVILLE #2 – SOUTH AUGUSTA 230 KV TIE LINE AND URQUHART – GRANITEVILLE 230 KV LINE AND ASSOCIATED FACILITIES?

A. The Graniteville #2 – South Augusta 230 kV Tie Line and Urquhart – Graniteville 230 kV Line will have very low overall visual effects for the following four primary reasons:

- The Lines will be built within an existing SCE&G right-of-way and on the Urquhart Generating Station site and will, therefore, not pose any significant visual modifications resulting from right-of-way clearing;
- The Graniteville #2 – South Augusta 230 kV Tie Line and Urquhart – Graniteville 230 kV Line will replace an existing 115 kV line that utilizes wooden H-Frame structures;
- The Lines will share an existing SCE&G right-of-way with multiple other existing SCE&G transmission lines for approximately 17.2 miles of their total 18.1-mile length; and,
- Significant portions of the Lines' route will traverse undeveloped areas where existing trees on each side of the right-of-way will provide significant screening.

I personally conducted the field study and computerized analysis that led to the determination that no adverse effects to historic resources will occur as a result of constructing the Graniteville #2 – South Augusta 230 kV Tie Line and Urquhart –

Graniteville 230 kV Line. I also led and participated in the field study that determined areas where the proposed Lines will be visible from public roads. Being very familiar with the visual implications of this project, including the degree to which visual recognition of the proposed lines will be mitigated by removal of an existing 115 kV line and the presence of multiple other lines alongside the proposed Lines, it is my professional opinion the Graniteville #2 – South Augusta 230 kV Tie Line and Urquhart – Graniteville 230 kV Line will have no adverse visual effects to the region.

Q. IS THE IMPACT OF THE PROPOSED GRANITEVILLE #2 – SOUTH AUGUSTA 230 KV TIE LINE AND URQUHART – GRANITEVILLE 230 KV LINE AND ASSOCIATED FACILITIES UPON THE ENVIRONMENT JUSTIFIED CONSIDERING THE STATE OF AVAILABLE TECHNOLOGY AND THE NATURE AND ECONOMICS OF THE VARIOUS ALTERNATIVES?

A. Yes. Because SCE&G has made the decision to build the Graniteville #2 – South Augusta 230 kV Tie Line and Urquhart – Graniteville 230 kV Line entirely within existing SCE&G right-of-way, except for a 0.92-mile segment that will reside in new right-of-way on the Urquhart Generating Station site, the resulting environmental, land use, cultural resource, and aesthetic effects are minimized. Moreover, as Witness Richards states in his testimony, SCE&G considered several alternatives to the proposed lines and associated facilities and determined that the

1 proposed facilities are the superior solutions to provide its customers with long-term
2 electrical system reliability.

3
4 **Q. IN YOUR PROFESSIONAL JUDGMENT, WAS SCE&G'S DECISION TO**
5 **USE THE EXISTING RIGHT OF WAY ROUTE, INSTEAD OF**
6 **EVALUATING OTHER GREENFIELD ROUTES, FOR THE**
7 **GRANITEVILLE #2 – SOUTH AUGUSTA 230 KV TIE LINE AND**
8 **URQUHART – GRANITEVILLE 230 KV LINE PROPER?**

9 A. Yes. In my professional judgment, SCE&G's decision to use the existing
10 right-of-way route for the Graniteville #2 – South Augusta 230 kV Tie Line and
11 Urquhart – Graniteville 230 kV Line was proper.

12 **Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?**

13 A. Yes.